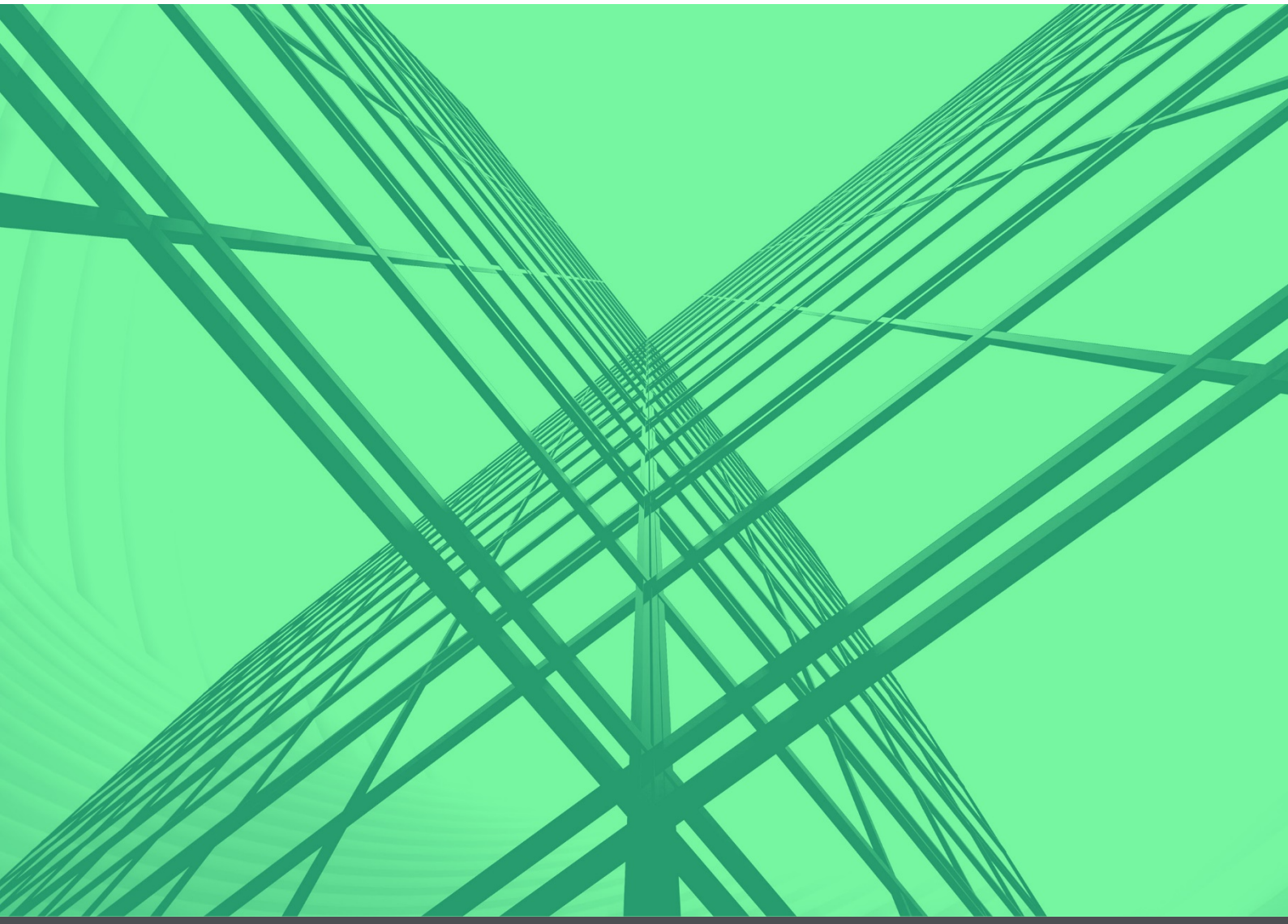
The Institution of Structural Engineers

Technical Report Guidance

Chartered Membership - Route A and Route B

Version: 1



Technical Report Route for Chartered Membership
Guidance for Candidates

Introduction

The UK Standard for Professional Engineering Competence (UK-SPEC) defines the standards required for engineers to be registered with Engineering Council as a Chartered Engineer (CEng). As UK-SPEC does not impose any additional requirements on applicants working to the previous standards (SARTOR 3), all Engineering Council licensed professional bodies, including the Institution of Structural Engineers, are required to implement UK-SPEC.

In the regulations for registration, UK-SPEC states that the minimum academic requirements for registration as a chartered engineer are to be an MEng degree (accredited to CEng level) or a BEng (Hons) degree (accredited to CEng level) plus either an approved Masters degree or "*appropriate further learning to Masters level*". One of the acceptable types of appropriate further learning to Masters level identified in the UK-SPEC regulations for registration is a Technical Report.

For the Technical Report route, Engineering Council states:

> "Applicants whose career history indicates that they have **sufficient engineering experience** may be authorised to submit a technical report. This shall demonstrate that they have the engineering knowledge and understanding necessary to underpin the UK-SPEC competence standards for the applicant's category of registration, to the same level as their peers who have followed the UK-SPEC exemplifying pathways. **Its content must be technical**; a pure management study is not acceptable. The scope of the report shall depend upon the applicant's initial qualifications and any subsequent achievement."

The submission of a Technical Report is intended to cover a wide range of applicants including those who have already qualified as Associate-Members of the Institution. In addition, applicants with ordinary degrees, non-accredited degrees, higher national diploma or certificate qualifications and mature candidates without formal higher education qualifications may be able to submit a Technical Report in order to demonstrate that they have the engineering knowledge and understanding that is equivalent to Masters level. It is important to understand, however, that, in the first instance, some applicants may be better placed to aim for Associate-Membership of the Institution with a view to progressing to Chartered Membership as they gain more knowledge and experience. Further guidance on the routes to Associate-Membership is provided at http://www.istructe.org/membership/Pages/Associate-Member.aspx.

This document provides guidance for applicants seeking chartered status and who intend to submit a Technical Report in lieu of an accredited MEng degree or equivalent. The following two routes are described:

Route A: For applicants holding an accredited BEng (Hons) degree in civil and/or structural engineering or who are AMIStructE holding an accredited degree for Incorporated Engineer or its equivalent.

Route B: For applicants not holding formal academic qualifications needed to apply for Chartered Structural Engineer status through the conventional route to membership.

Procedures for Route A and Route B Applicants

It is important to stress the context of the following procedures: **The Technical Report Route is intended to be undertaken by applicants with sufficient experience to proceed immediately to the Institution's Professional Review Interview (PRI).** It is assumed that all applicants will have already undertaken significant further learning beyond their degree studies and the requirements for their Technical Report will depend on both the initial degree level and the extent of any further academic and experience-based learning which has been undertaken towards Masters level.

The Technical Report

The Technical Report combined with the applicant's professional development must demonstrate that the applicant has achieved the knowledge and understanding of structural engineering principles that would normally be expected of the holder of an MEng degree that has been accredited by the Institution to Chartered Membership level. The required levels of knowledge and understanding are exemplified by the output standards listed in section 3. The principal objective of the report is to demonstrate to two independent assessors that the candidate has achieved the three sets of output standards listed in section 3. Details of the assessment process are given in section 2.

Applicants submitting a Technical Report will normally have been engaged in structural engineering practice in a graduate engineer capacity for a sufficient number of years, and will be expected to have worked towards the required standards of the Institution's Initial Professional Development (IPD) core training objectives for Chartered Membership. Further details of the IPD requirements are available from the Institution's website.

Five of the thirteen core objectives are classified as "Engineering" objectives and relate specifically to a number of structural engineering activities such as conceptual design, analysis and design of structural forms, specification of materials, and construction techniques. Most of these involve the application of scientific principles and the use of mathematical and computer models. There is, therefore, some overlap between the engineering core objectives and the output standards that have to be addressed by the candidate in their Technical Report. Although linked with initial professional development, the submission of a Technical Report is a separate requirement from the Professional Review process.

The report should demonstrate particularly the candidate's understanding of engineering principles and their ability to integrate in structural design and engineering practice their knowledge of mathematics, science and computer-based methods, and their ability to generate innovative and appropriate designs. To demonstrate that understanding, the report is expected to contain some discussion of the validity of the principles relating to the subject of the report. Candidates should, at the outset and through the report, ask themselves the questions: **What are the basic principles to be discussed and how do I demonstrate my understanding of them?** The report will be judged on the extent to which these questions have been successfully tackled and whether the applicant has a clear grasp of the principles of engineering science relating to the topic as would normally be expected of a graduate assessed at Masters level.

Whether Route A or Route B, the report should comprise the following parts for each project:

- ***Conceptual Design:*** A critical appraisal of any distinct and viable solutions considered, with the use of sketches and supporting notes outlining the intended load transfer mechanisms, framing and stability functions, and including construction methodology. An evaluation of the merits and disadvantages of these solutions concerning cost or buildability which influenced the final recommended solution. A full description of the solution adopted to include structural framing, stability, robustness and buildability.

- ***Calculations:*** The verification of structural viability of the selected scheme should be demonstrated with sufficient design calculations by hand which are normally carried out during preliminary design in order to

establish the form and size of salient structural elements. Calculations may range from the validation of initial concept models, through the verification of subsequent computer modelling, to the calculations for important structural component assemblies. Computer generated calculations must be validated by hand.

- ***Drawings:*** Sufficient drawings with general arrangements, sections and/or elevations should be included to show the layout, disposition and dimensions of structural elements. All drawings must be A4 in size.

For Route A candidates, the Technical Report should be a ***3,000*** to ***5,000*** word coherent document drawn from typically two substantial projects on which the candidate has been engaged in a responsible capacity. The appendices must not exceed thirty pages.

For Route B candidates, the Technical Report should be extended to a ***5,000*** to ***10,000*** word document, to allow additional proof to be presented which demonstrates the applicant's academic equivalence at Masters level. Again, typically, two projects should be chosen as a platform for demonstration of this academic equivalence.

The report should be written in the English language and typewritten or printed on A4 paper. A reference list should be provided, and the text should be illustrated by diagrams. The report should be well structured and consistent with good practice for technical papers with regard to such matters as section headings, figures, equations, references, acknowledgements, and appendices. The text should be as simple and concise as possible consistent with arguments being easily understood, thereby in itself demonstrating one key skill associated with masters level learning.

An electronic copy of the Technical Report should be submitted via email to the Membership Department of the Institution with a signed declaration clarifying exactly which parts of the submission are the candidate's own contribution, and with the Technical Report Assessment fee (£275 to be submitted at main submission stage), and checklist for output standards.

Applicants are reminded that it is their own responsibility to obtain their employers' permission to submit work of a confidential nature. Special arrangements can be made at the specific request of employers in cases where security sensitive items need to be presented.

The Technical Report Submission Process

The submission process will consist of four stages:

- An initial assessment of Application Form.
- Submission and Assessment of the Synopsis.
- Submission and Assessment of the Technical Report.
- The Technical Report Interview (TRI).

Stage 1 – The Initial Assessment

The following should be prepared and submitted to the Institution:

- Application form G and the relevant Graduate membership subscription fee (if not already in membership).
- A certified copy of any academic qualifications, including transcripts.

- Only if applying through Route B, a comprehensive Curriculum Vitae covering the applicant's whole career, including positions held.

The application form and further documents will be considered by the Institution's Academic Qualifications Panel. If the academic qualifications and experience-based opportunities for further learning are both considered to be appropriate, the applicant will be informed that they may proceed to submit a synopsis for their Technical Report, and they will normally be allowed up to a year for submission.

Stage 2 – The Synopsis

When invited to submit a synopsis, the following should be prepared and submitted to the Institution:

- Only if applying through Route A, a comprehensive Curriculum Vitae covering the applicant's whole career, including positions held.
- A statement (with appropriate evidence) of any further learning towards Masters level.
- Application form TR/m which includes a 400–700 word synopsis of the proposed Technical Report setting out clearly how technical competence and understanding of engineering principles are to be demonstrated.
- The synopsis fee.

For all applicants, a named IPD Mentor should be consulted in the preparation of the synopsis. For Route B applicants, the Academic Qualifications Panel will seek evidence that the IPD Mentor has a profound engagement with the applicant, and this evidence should be provided at this stage.

The synopsis will be considered by the Institution's Academic Qualifications Panel. If the synopsis is approved, the applicant will be informed that they may proceed to submit the Technical Report, and they will normally be allowed up to a year for submission. All applicants will receive feedback advice from the Academic Qualifications Panel on writing their particular Technical Report. Route B candidates will, in addition, receive further detailed recommendations on the content of their Technical Report, to help ensure that Masters level academic equivalence is being demonstrated.

Stage 3 – Submission and Assessment of the Technical Report

When invited to submit the full Technical Report, the following should be prepared and submitted to the Institution:

- An electronic copy of the appropriate Technical Report (submitted by email).
- The appropriate Technical Report Assessment fee.
- A completed self-assessment checklist for output standards.

The Technical Report will be assessed by two Assessors. The Assessors' reports will be considered by the Academic Qualifications Panel and candidates will be advised if they are eligible to proceed to the Technical Report Interview.

Stage 4 - The Technical Report Interview

All Technical Report Interviews will be conducted by two independent Assessors who have been trained by the Institution.

All interviews will be conducted at the Institution of Structural Engineers in London, or at an alternative designated centre. The Interview will normally take place in July and last approximately one hour. Candidates who are not permitted to proceed to the Professional Review Interview will be given reasons for the decision and appropriate written advice on how to remedy any deficiencies. This written advice will normally be sent to candidates immediately following the next meeting of the Academic Qualifications Panel.

Candidates who successfully complete all stages of the Technical Report Route process will be able to apply for Chartered Membership.

The following Section 3 gives some guidance on the output standards to be assessed from the Technical Report and the Technical Report Interview. **All three sections of the criteria listed must be covered by the Technical Report**.

Output Standards

The applicant's Technical Report and Technical Report Interview will be assessed against the output standards listed below. These are based on the generic competencies defined by EC^{UK} for Masters level. A successful applicant will be expected to demonstrate the following:

A Underpinning Science and Mathematics

- An understanding of the scientific principles of structural engineering and related geotechnics and civil engineering aspects;
- An awareness of developing technologies in structural engineering;
- Knowledge and understanding of mathematical and computer models relevant to structural engineering, and an appreciation of their limitations.

B Engineering Analysis

- Ability to apply mathematical and computer-based models for solving problems in structural engineering, and an ability to apply alternative approximate methods for their validation;
- Ability to use fundamental knowledge and judgement to investigate appropriate structural technologies.

C Design

- An ability to generate and evaluate innovative and appropriate designs;
- Knowledge and understanding of structural design processes, ranging from the development of alternative initial concepts, through subsequent modifications and development, to the details of fabrication and construction;
- Knowledge of the whole life aspects of the design of buildings and structures, including their construction, operation, adaptation and removal;
- An ability to assess structural risks, and potential modes of failure and environmental degradation.

Applicants are strongly advised to check the template of the Assessors' Form which is used in assessing the Technical Report to ensure that all relevant required areas for assessment have indeed been adequately addressed.

Resubmission Procedure

At each stage of the Technical Report process, all submissions will be discussed, and formal decisions will be decided upon at the next available Academic Qualifications Panel meeting. If an applicant is unsuccessful at any stage of the process, detailed individual feedback will be provided, and specific resubmission information

will be set out. The candidate will be advised of appropriate remedial action. This may include revision of the original report or synopsis, or it may be recommended that the candidate submits a different synopsis or report. In such cases the Panel will take into account the ability of the report in terms of its content, depth and breadth to deliver and demonstrate the required learning outcomes. If a candidate is unsuccessful at a Technical Report Interview, the Panel will once again give specific feedback on the issues and concerns that were raised. Normally, candidates will be invited to attend a second interview but may be asked to make revisions to a report or bring additional documentation to the interview. The Panel reserves the right to request that a candidate resubmits at any stage of the Technical Report Route process according to a timetable determined by the Panel.

Appeals Procedure

If you wish to appeal against a decision, guidance on the appeals process can be found under Section 1.16.2 of the Institution's Royal Charter, Bye-laws, Regulations and Standing Orders:

Summary of the Principal Differences Between Route A and Route B Applications

The following summarises the differences between the Route A and Route B application processes.

- Route A requires a 3,000 to 5,000 word Technical Report. Route B requires a 5,000 to 10,000 word extended Technical Report.
- Route B applicants should submit their comprehensive career-summary CV at Stage 1. Route A applicants submit the equivalent at Stage 2.
- All applicants must have a named mentor, but evidence should be provided for Route B applicants of the Mentor's deep involvement with their career progression.
- Route A applicants may possibly be permitted to sit the Technical Report Interview and the Professional Review Interview on the same day. No such possibility exists for Route B applicants.
- After acceptance of the synopsis, the Academic Qualifications Panel will provide feedback for Route A applicants in helping them ensure their Technical Report provides the necessary evidence of Masters level academic equivalence. More detailed feedback in this connection will be provided for Route B applicants.